



United States Department of Agriculture

NRCS Lockeford Plant Materials Center

2018 Progress Report of Activities

December 2018

The Lockeford Plant Materials Center (CAPMC) strives to provide information that will be useful to Service Center staff and their clients, with emphasis on supporting Customer Service for USDA. This report highlights some of our activities during 2018 and includes links to issued Technical Documents, mainly located on the CAPMC [website](#).

Studies

Cover Crops: We continued to work on several multi-year studies during 2018 including the final year of the National Adaptation Cool Season Cover Crop Trial, a Warm Season Cover Crop Trial and an Insectary Cover Crop Trial (Figure 1).



Figure 1a. Using the plot planter and tractor for study planting the cover crop demonstration trial in fall 2018.



Figure 1b. Adaptation Cover Crop Trial, cereal rye plots. Note the different cultivar heights, 2/8/18.



Figure 1.c Warm Season Cover Crop Trial, grown with a total of 1 inch of irrigation water, photo at 67 days after planting, 8/24/18.



Figure 1d. Delta College volunteer and CAPMC Agronomist, Valerie Bullard, collect data from Insectary Cover Crop Study, 2/14/18.

The National Adaptation Trial was an unirrigated, replicated trial conducted for two years to compare cultivars of cereal rye, black oat and black seeded oat, winter pea, hairy vetch, daikon radish, and red, crimson, and balansa clovers (Figure 1b). Data collection included germination, maturity dates (50% bloom or 50% anthesis), height, disease and insect resistance, biomass and nitrogen accumulation. These results will provide information on the best cover crops cultivars to select for different regions in the US.

Warm Season Cover Crops (WSCC) require warm temperatures for germination and growth but cannot survive freezing temperatures. After winterkill, the residue provides erosion control as the biomass breaks down over the winter. The rate of decomposition, nitrogen accumulation and weed control provided depends on the species of WSCC selected and may allow for earlier field prep and cash crop planting in the spring, compared to cool season cover crops. This trial investigated 11 different species and 4 cowpea cultivars, all planted on June 22. A total of 1 inch of irrigation water was applied through a linear sprinkler system in ¼ inch amounts from June through August (Figure 1c, and 6c).

An Insectary Cover Crop Study, in collaboration with the Xerces Society, included four mixtures specifically designed for use in perennial systems combining native and cover crop seed (Figure 1d). Two almond mixes (an experimental almond mix and the standard Xerces almond pollinator mix), a walnut mix and a vineyard mix were planted in fall of 2017. These plots will be monitored for three years for plant establishment, bloom duration, and soil health under management regimes of mowing, disking and herbicide use.

Two new trials planted in 2018 in collaboration with USDA-ARS will assess cover crop breeding lines of crimson clover, hairy vetch, winter pea, and fava bean.



Asclepias eriocarpa, woollypod milkweed.



A. fascicularis, narrow-leaved milkweed.



A. speciosa, showy milkweed

Figure 2. Milkweed plots established from seed in fall of 2017, growth by July 2018.

Monarch Butterfly: A Milkweed Establishment Trial with woollypod milkweed, (*Asclepias eriocarpa*), narrow-leaf milkweed, (*A. fascicularis*), and showy milkweed (*A. speciosa*) evaluated establishment from seed, plugs and rhizomes. The study was conducted in collaboration with the Xerces Society and Hedgerow Farms. Replicated seed plots and rhizomes were planted in fall 2017, while plugs were planted in early fall, early spring, and late spring. Irrigation water was applied through a drip line until the plants were well established. Although the plots had been solarized, there was still significant weed pressure, requiring hand weeding. All three-species established from seed and plugs, although growth was better

with fall and early spring plantings. Showy milkweed grew from rhizomes, while the narrowleaf milkweed did not (no woollypod rhizomes were planted in this trial).

Field Plantings

Field Plantings offer an opportunity for the CAPMC to collaborate with NRCS field offices (FO) and NRCS partners on a study or demonstration with the aim of providing information that is directly applicable to their situation. In 2018, several field plantings were either initiated or continued across the state to evaluate cover crop, or range mixes in real world settings (Figure 3). NRCS field plantings included: increasing infiltration in a walnut orchard and improving forage production in rangeland in San Joaquin County with the Stockton FO; monitoring drought resilience in a walnut orchard in Tulare County with the Visalia FO; monitoring soil health properties in a prune orchard in Sutter County with the Yuba City FO; soil health improvement in an organic citrus orchard in Ventura County with the Oxnard FO. Soil health assessments and plant species evaluations will be collected yearly, prior to termination. After three years, a technote or case study will be written, summarizing the results.

Other field plantings in collaboration with East Stanislaus RCD included cover crop demonstrations in orchards and row crops in Tulelake, Salinas, Fowler, and Victorville. For more information on these field planting projects please contact Valerie Bullard, PMC Agronomist.



Kate Howard and Kyle Venell from Yuba City FO take soil samples from a cover crop planting in a prune orchard in Sutter Co., April 2018.



Cover crop field planting evaluations with Rob Roy and Brook Gale in a young walnut orchard in Tulare County, April 2018



Sonya Miller, Stockton FO, taking cover crop evaluations for a field planting in a walnut orchard in San Joaquin County, April 2018.

Figure 3. Field Plantings in 2018 with thanks to the Stockton, Yuba City and Visalia Field Offices.

Trainings at the PMC

The CAPMC held several trainings both at the PMC and at Field Days around the state to speak on findings from the cover crop studies (Figure 4). Trainings at the PMC included:

- Sacramento Valley Range and Pasture Seeding Workshops for Area 1 employees at the PMC on 2/28/2018 and 3/13/2018.
- Cover Crop Selection and Adaptation Training. A full day event held at the PMC as part of a Western SARE grant from the East Stanislaus RCD for Conservation Planners on 3/14/2018.



Figure 4a. Participants at the Western SARE cover crop training in March 2018.



Figure 4b. Participants in the Range Seeding training counting seeds as part of a seeder calibration activity.

Figure 4. Training Events held at the PMC during 2018.

The CAPMC is grateful for assistance from 3 students from Delta College in Stockton and 2 students from American River College in Sacramento. They were signed up as Earth Team volunteers and assisted us during the year (Figure 5).



American River College volunteer and Farm Foreman, Matthew Bronson, erected an owl box



American River College volunteer, sampling radish from Adaptation Cover Crop Study



Delta College volunteers holding tillage radish samples from the cover crop plantings.

Figure 5. Activities carried out by student Earth Team volunteers.

Outreach to NRCS Customers, Partners and the Public

It was a busy year at the PMC and we are grateful for the support of many individuals and groups. Partners included the East Stanislaus and San Joaquin Resource Conservation Districts, and non-profit organizations including the Xerces Society, the Intertribal Agriculture Council, the Lockeford Protection

District and UC Extension, particularly San Joaquin County. Use of the PMC as an outreach site continued with the following events held at the PMC (Figure 6):



Figure 6a. PMC Agronomist, Valerie Bullard explaining findings from the Adaptation Cover Crop Study at the Open House, 4/4/18.



Figure 6b. Hudson Minshew, State Agronomist, speaking to CA Secretary of Agriculture Karen Ross at CDFA Soil Health Field Tour for Agriculture Council, 6/22/18.



Figure 6c. Wendy Rash, District Conservationist, Vacaville, speaks on NRCS Conservation Programs at the WSCC Field Day, 8/22/2018.



Figure 6d Students from 3 local High Schools participate in a FARMS leadership event working to make cuttings of native plants, 11/29/18.

Figure 6. Outreach events held at the PMC during 2018.

- Annual CAPMC Open House focusing on Cover Crops and Riparian Restoration, 4/4/2018 (Figure 6a). Attended by 66 people including NRCS, RCD, producers and the public. Our lunch sponsor was the San Joaquin RCD.
- Warm Season Cover Crop Field Day with 50 attendees, including NRCS Service Center staff and producers, 8/22/2018 (Figure 6c).
- Area 3 DC Meetings, 4/11/2018 and 9/11/2018; Area 3 All Employee Meeting, 9/12/2018.
- California Agriculture Council for a Soil Health and Cover Crops Tour. Organized by CDFA, CA Secretary of Agriculture attended with representatives from the Farm Bureau, Almond Alliance and Strawberry Commission, 6/22/2018 (Figure 6b).
- The Center for Land Based Learning, held a FARMS (Farming, Agriculture and Resource Management for Sustainability) training day at the PMC on 11/29/2018, with teachers and

students from local high schools learning about agriculture careers and plant propagation (Figure 6d).

- Native plants including elderberry and yarrow were grown at the CAPMC in a Partnership with interns from the Intertribal Agriculture Council, UC Arboretum and provided to the Maidu Summit Consortium for planting into the Humbug Valley.
- An Agreement with the BLM provided plant materials for restoration activities to the Mother Lode Field Office with plant materials grown for the Pine Hill and Cosumnes Preserves.

Technical Documents

These publications were produced during 2018 and intended to provide technical information and support to our Area, Field Office and Service Center staff. These publications (apart from the Case Studies that can be found in the eFOTG) are posted on the CAPMC website and can be accessed from the links here.

<https://www.nrcs.usda.gov/wps/portal/nrcs/main/plantmaterials/pmc/west/capmc/>:

Case Studies: Brief location-based information.

[Analysis of Soil Health Properties in a California Prune Orchard.](#)

[Commercial Pollinator Mixes](#)

[Maturation Dates of Warm Season Cover Crops.](#)

[Winterkill Cover Crop Demonstration](#)

Plant Guides:

[Great Valley Phacelia, *Phacelia ciliata*](#)

[Lacy Phacelia, *Phacelia tanacetifolia*](#)

[Whiteleaf Manzanita, *Arctostaphylos manzanita*](#)

Technical Notes:

[Revised Cover Crop Chart for California](#)

[Cover Crop Seed Vendors for Western States](#)

Video: “Maximizing cover crop benefits for growers” produced by AgNetWest,

<http://agnetwest.com/maximizing-cover-crop-benefits-growers/>

A revised version of the eVeg Guide (Version 4) <http://www.calflora.org/nrcs/index.html> was released on November 15, 2017 for initial testing for improvement. This is the result of extensive work by Dr. Ken Lair, with input from Area Offices, State Office Leads and CAPMC staff over the past year.

The Lockeford Plant Materials Center

The Lockeford Plant Materials Center is a 106- acre facility located in the Central Valley of California and is the only PMC within the state. There are 27 PMCs around the country, with each one serving a specific ecological and geographic area. The CAPMC addresses the resource concerns within the Mediterranean climate areas of California. We work with NRCS field offices, public agencies, universities, conservation organizations, tribes, commercial seed producers and nurseries.

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